

Docket No. 500.44257X00  
Serial No. 10/506,540  
Office Action dated September 7, 2006

### **AMENDMENTS TO THE CLAIMS**

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The following listing of claims replaces all prior listings, and all prior versions, of claims in the application.

#### **LISTING OF CLAIMS:**

1. (Currently Amended) A method of illumination, comprising the steps of:  
  
emitting light from each of a plurality of light sources separately arranged in a one-dimensional or two-dimensional form;  
  
spatially decomposing via a light integrator the light emitted from each of the plurality of light sources, and thus generating a multitude of secondary light source images, wherein a divergence angle in the light flux emitted from each of the plurality of light sources is adjusted to stay within a ratio of 1 versus 1.5 with respect to any two directions within a plane vertical to an optical axis of the emitted light flux; and  
  
overlapping via a condenser lens the light emitted from the multitude of generated secondary light source images, and thus illuminating a region to be illuminated.
2. (Original) The method of illumination according to claim 1, wherein a region in which the plurality of light sources are arranged, or a light-emitting region of the secondary light sources obtained from the plurality of light sources is made analogous to a shape of the region to be illuminated.
3. (Original) The method of illumination according to claim 1, wherein the light sources are semiconductor laser light sources.

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4. (Currently Amended) ~~A~~The method of illumination according to claim 1, comprising the steps of:
- emitting light from each of a plurality of light sources separately arranged in a one-dimensional or two-dimensional form;
- spatially decomposing via a light integrator the light emitted from each of the plurality of light sources, and thus generating a multitude of secondary light source images; and
- overlapping via a condenser lens the light emitted from the multitude of generated secondary light source images, and thus illuminating a region to be illuminated;
- wherein the light integrator comprises an array of a plurality of rod lenses; and
- wherein a ratio " $r_1/r_0$ " between an aspect ratio " $r_1$ " of the sectional shape of each rod lens that is perpendicular to an optical axis thereof, and an aspect ratio " $r_0$ " of the region to be illuminated, is 0.8 or more and 1.2 or less.

5. (Currently Amended) The method of illumination according to claim 1 or 4, wherein the light entering the light integrator or the light exiting the light integrator passes through a rotating modulator which surface is processed in a radial form so that its sectional view varies in height in nearly a sinusoidal fashion~~varies wavefronts.~~

6. (Canceled)

7. (Original) The method of illumination according to claim 1, wherein energy of the light emitted from the light sources is controlled.

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8. (Original) The method of illumination according to claim 1, wherein each light ray emitted from the plurality of light sources or from secondary light sources is caused to enter an associated position on the light integrator via condensing optical system.

9. (Canceled)

10. (Currently amended) A method of light exposure, comprising the steps of:  
emitting light from each of a plurality of light sources separately arranged in a one-dimensional or two-dimensional form;

spatially decomposing via a light integrator the light emitted from each of the plural light sources, and thus generating a multitude of secondary light source images, the light integrator comprises an array of a plurality of rod lenses; and wherein a ratio " $r_1/r_0$ " between an aspect ratio " $r_1$ " of the sectional shape of each rod lens that is perpendicular to an optical axis thereof, and an aspect ratio " $r_0$ " of the region to be illuminated, is 0.8 or more and 1.2 or less; and

overlapping via a condenser lens the light emitted from the multitude of generated secondary light source images, and thus illuminating an illumination target region having a pattern to be exposed;

wherein the illuminated pattern to be exposed is exposed by projecting transmitted or reflected light onto an exposure target region of an exposure target object via projection optical system.

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11. (Original) The method of light exposure according to claim 10, said method being characterized in that a region in which the plurality of light sources are arranged, or a light-emitting region of the secondary light sources obtained from the plurality of light sources is made analogous to a shape of the region to be illuminated.

12. (Original) The method of light exposure according to claim 10, wherein the light sources are semiconductor lasers light sources.

13. (Canceled)

14. (Currently Amended) The method of light exposure according to claim 10, wherein the light entering the light integrator or the light exiting the light integrator passes through a rotating modulator which surface is processed in a radial form so that its sectional view varies in height in nearly a sinusoidal fashion ~~varies wavefronts.~~

15. (Currently Amended) A light exposure apparatus comprising:

an illumination optical system including:

a light source array formed of a plural separate light sources arranged one-dimensionally or two-dimensionally;

a condensing optical system for condensing light emitted from each light source of said light source array;

a light integrator for spatially decomposing the light condensed by said condensing optical system, and thus generating a multitude of secondary light source images, said light integrator of said illumination optical system

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comprises an array of a plurality of rod lenses and is adapted such that a ratio " $r_1/r_0$ " between an aspect ratio " $r_1$ " of the sectional shape of each rod lens that is perpendicular to an optical axis thereof, and an aspect ratio " $r_0$ " of the region to be illuminated, is 0.8 or more and 1.2 or less; and

a condenser lens for overlapping the light rays emitted from the multitude of secondary light source images generated by said light integrator, and thus illuminating an illumination target region having a pattern to be exposed; and

a projection optical system for projecting transmitted or reflected light onto an exposure target region of an exposure target object in order to expose the pattern to be exposed that is illuminated by said illumination optical system.

16. (Original) The light exposure apparatus according to claim 15, wherein in said illumination optical system, a region in which the plurality of light sources are arranged, or a light-emitting region of the secondary light sources obtained from the plurality of light sources is made analogous to a shape of the region to be illuminated.

17. (Original) The light exposure apparatus according to claim 15, wherein in said light source array of said illumination optical system, the light sources are semiconductor lasers light sources.

18. (Canceled)

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19. (Currently Amended) The light exposure apparatus according to claim 15, wherein said illumination optical system further includes a rotating modulator which surface is processed in a radial form so that its sectional view varies in height in nearly a sinusoidal fashion~~that varies wavefronts of light~~, on the incident side or exit side of said light integrator.

20. (Original) The light exposure apparatus according to claim 15, wherein said illumination optical system further includes divergence angle adjusting optical system for adjusting a divergence angle of the light emitted from each light source of said light source array.

21. (Original) The light exposure apparatus according to claim 20, wherein said divergence angle adjusting optical system include a cylindrical lens.

22. (Original) The light exposure apparatus according to claim 15, wherein said illumination optical system further includes light source control means for performing energy control of the light emitted from said light sources of said light source array.

23. (Original) The light exposure apparatus according to claim 15, wherein said illumination optical system further includes a detector for measuring intensity of the light emitted from said light sources of said light source array.

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24. (New) A rotating modulator which varies wavefronts of light comprising:  
a surface which is processed in a radial form so that its sectional view varies  
in height in nearly sinusoidal fashion.